

BOOK REVIEW

FINITE-ELEMENT MODELLING OF UNBOUNDED MEDIA,
John P. Wolf and Chongmin Song, ISBN 0-471-96134 5, published by
John Wiley & Sons, 1996.

This volume is Wolf's fourth major work on the subject of dynamic soil-structure interaction, which includes some truly innovative techniques for the treatment of unbounded domains. Perhaps the most remarkable aspect of the methodology proposed by the authors is that it is based entirely on finite-element concepts, and does not rely at all on the use of the abstruse boundary elements normally required for such problems. This allows the authors to formulate appropriate dynamic boundary conditions for media in which the material properties may change arbitrarily in directions parallel to the boundary, while at the same time preserve the mechanical radiation characteristics into the infinite medium. In addition, the boundary need not follow a plane, spherical or cylindrical contour, as is required in classical methods, but can follow an irregular path.

The book has 14 chapters grouped into an Introduction followed by three parts, and it includes an appendix with benchmark examples. The first part deals with what is perhaps the most interesting and original aspect of the book, namely the *Consistent Infinitesimal Finite-Element Cell Method*; the nine chapters in this section present the essential aspects of this new method for modelling infinite media. The second part, with two chapters, is devoted to the *Damping Solvent Extraction Method*, which allows simulating

unbounded media by means of bounded domains *via* finite elements that include fictitious damping, which is later removed. Finally, the last two chapters in the third part are concerned with an application of the Doubly Asymptotic Multi-directional Transmitting Boundary.

More than a textbook, this volume resembles a massive technical paper. Nevertheless, it is destined to become an essential reference to researchers dealing with numerical models for the solution of problems in dynamic soil-structure interaction. It is clearly organized and well written, so that the basic ideas can readily be grasped with even a cursory reading. The reader should be prepared for some serious study, however, if the ultimate goal is to acquire command of the material to the point where the proposed techniques can be put to actual use.

A detailed user's manual with examples and the source code (in FORTRAN 77) for the methods presented in the book are available, for free, from the publisher.

Eduardo Kausel
Department of Civil and Environmental Engineering,
Rm 1, 271
Massachusetts Institute of Technology
Cambridge
MA 02139
U.S.A.